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# Product Related Values and Sustainability – Deeper Understanding of the Millennials

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In addition to increasing productivity, digitisation and automation are an important part of the sustainability issue. Therefore, investments aimed at environmental protection and long-term sustainability appear to be on the rise among companies with strong innovation activities in the industrial environment. This article presents the results of a study that outlines young people's assessment of the automation and digitisation opportunities on offer. In addition to traditional values, the goal is to find out how they perceive the importance of Industry 4.0 solutions in shaping the way a company operates. The survey was conducted in two countries, Hungary and Poland. It sought to answer the question of how groups, which by definition are well-defined by certain demographic characteristics, determine their preferences with regard to the above-mentioned areas and how they differentiate them. Relationships between clusters - based on preference-related differences - with respect to product manufacturing, i.e., variables that are considered important to companies, were examined. It can be concluded that the environmental issues and, due to this, sustainability is not equally important (range: 3.512 to 4.308). The traditional features of the products were important for everyone (4,407 to 4,549), and the smart features were differently evaluated (2,607 to 3,386). Overall, looking at the relationship between sustainability-related values will bring us closer to further typology and a better understanding of the clusters, making them more accessible and easier to understand and thus enabling a more effective strategy to be implemented with a focus on sustainability.

### 1. Introduction

Digital transformation has become part of everyday life in business organisations (Baskaran and Rajavelu, 2020). Digitisation puts emphasis on digital technologies, and digitisation describes a number of socio-technical phenomena that are affected by their use in broad individual, organisational, and social contexts (Hess, 2016). The first wave of digitisation focused on technologies that replaced information spilt on paper with computers. The second wave gave rise to the Internet as a global communication infrastructure, which led to changes in the logic of creating company value and new types of business, such as e-commerce or intermediaries (Legner et al., 2017). A number of factors have influenced the spread of automation and other digital solutions, which include both economic and social elements. It is clear from the literature that a digital generation has grown up from Generation Y, who are increasingly adopting digital solutions in their own environment and who see virtual reality and virtual worlds as their own environment (Ersöz and Askeroğlu, 2020).

This generation is seen by businesses as both employees and consumers. The digital shift needs to be looked at from two angles. On the one hand, it can bring efficiency gains in the workplace - generating cost savings or even yield gains. On the other hand, it can lead to more valuable products and services in the marketplace, generating higher revenues. This means a supply that is in demand by young people.

Young people – as digital natives – and researchers are expected to provide outside insight into digital opportunities in their industries and help them innovate and support digital business models, products, and services. Therefore, a topic was taken that is interesting from a business point of view but can also be important in terms of creating innovations that affect sustainable development.

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In general, we can say that new processes, procedures, products and services created as a result of digital transformation and digital solutions are valuable in the market, i.e. have value (Zhong et al., 2017). Digital values can be defined on this basis. Sustainability, from protecting the environment to creating an ecosystem that is sustainable in the long term, also has high value. We also see that, in many cases, these values are interrelated. An idea for an application may be to replace unnecessary paperwork or save time, or it may be a decision preparation process that leads to a much better (more sustainability-supporting) decision. Reducing or preventing harmful effects.

The paper presents the results of the analysis in terms of digital values that may be important for young people. It was verified how young people value the opportunities offered by digitisation and automation as a result of Industry 4.0 (Culot et al., 2020). It then examined whether the clusters that were identified actually have significantly different attitudes towards digital innovation and values that also represent sustainable development.

In our study, we mapped the available literature on the topic, which made it clear that the gap identified as a research goal is to investigate the digital value judgments of Generation Y at the product, organizational, and purchasing decision levels. To investigate this, we validated our hypothesis through empirical research, revealing the gaps.

A novel aspect of the research is the approach of examining the attitudes of Generation Y and helping companies targeting them to develop a more precise action plan. By mapping and differentiating values based on the results, a different emphasis can be placed on what are otherwise strategically important factors. For example, depending on the target group, sustainability, product features, or digitalization can be prioritized at the level of operational actions.

#### 2. Values and evaluation criteria

In this section, we present our concept of value for research and the structural and main content features of the research questionnaire survey.

#### 2.1 What we consider as value - digital values vs. traditional values

Although the definition of value is not always clear and subject to many subjectivities (Perry, 1914), the thesis we apply to business analysis is the same as for customer value. When the buyer finds the product valuable, he will sacrifice himself to get it. That is, he will be willing to pay for it. With this in mind, we investigated Generation Y's perception of the attractiveness of digital content. We don't want to get into a philosophical debate, but we felt it was important to draw the lines because several previous papers have examined in detail the dilemmas inherent in value research and found that finding one good definition is almost impossible. However, we must because sustainability demands it. 'While the concept of 'value' is ancient and has been extensively developed over many centuries, mainly by philosophers and economists, the concept of 'customer value' is a relatively new subject of study in the marketing literature (Sparks et al., 2008, 563). 'Without value, the likelihood of a sustainability market is slim. However, consumer value research is still underdeveloped' (Hu et al., 2009, 98).

We tried to make the intangible tangible, following the example of Industry 4.0, which is now commonplace (Zhong et al., 2017). A list of traditional values (reliability, quality assurance, customer focus, standardisation, environmental protection, recycling) and a list of digital values (use of intelligent systems, real-time communication, intelligent factory operations, automated warranty processes, use of applications in production, innovations, robotisation, 3D visualisation) were developed. Along with these values, you can define factors that can help you create different clusters and profiled groups. The main drivers of value creation were novelty, robotics and digitisation, and environmental awareness (Kurucz et al., 2023).

#### 2.2 Value manifestations - research concept

For market environment actors, digital values were approached from three perspectives: 1) values embedded in products, 2) values embedded in companies' brands, and 3) values affecting purchasing decisions.

In this case, products, applications, and systems that support driving self-driving vehicles can be listed as having a digital value. The precision and accuracy of the robots can be seen as important to the product. A device with targeted apps and software can also be valuable if it is used to buy tickets or obtain information, for example. In addition to the classic value of security, cybersecurity is a digital value that is important not only to protect equipment but also to protect our personal data.

For companies, classic values have been seen to be effective in advertising and branding campaigns. Reliability, safety, and environmental awareness are market assets that companies see as valuable, but do young consumers and/or employees see it? Does a company's reputation or attractiveness increase when it is at a higher level of digital maturity?

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To this end, our research asked questions on topics that emphasised the technological use of digital solutions and even the ability to innovate. A smart factory is certainly more bug-free, but is that of any value? There is no doubt that I4.0 technologies also have potential for sustainability, be it in terms of material use (Patti et al., 2022), energy savings, process shortening or cost savings (Eppinger et al., 2021), and resources for better decision-making. The challenge is rather to introduce them to the market to check what value the result of such a project represents in the eyes of consumers.

The impact of digital values on purchasing decisions is negligible. An automated purchasing process can be more valuable, but we also saw that a new technological solution became a trend and then significantly improved the perception of the market. Continuous access to information is also important for decision-making and follow-up. Especially with digital products, constant updates and improvements can be extremely valuable. Previous research has also shown that young shoppers are willing to pay more for digital solutions to speed up service (Kurucz and Kovács, 2019).

#### 3. Empirical research

The scope of this empirical research was to verify the associations between the values-based clusters and product and production-related attitudes. The assumption was that the traditional values and digital values not just shaped the attitudes of Millennials but had an effect on their preference and attitude toward the product itself. Companies try to underline different characteristics, but finding the right emphasis is critical in this effective-oriented world. The research question was set like the value-based clusters have different attitudes toward the unique features.

The first round of the initial dataset was collected in 2019. Although representativeness was not ensured in this case, we sought to broaden our horizons by extending the sample (both in Hungary and Poland) as a further step in the research, providing a deeper insight into the subject area. Accordingly, the final sample was available in 2021. The sampling frame for the Hungarian sub-sample was a list of addresses provided by the vice-rectors of Hungarian higher education institutions, from which responses were received anonymously. Unfortunately, two universities did not respond to repeated requests, so our representative sample and our attempt to ensure that all institutions were represented were damaged.

The focus was on students who are currently studying because they are the most relevant in terms of defining and interpreting values among Generation Y. The Polish sub-sample was created in a similar way to the Hungarian one. According to the assumption, these values had an indirect association with the preference itself (see Figure 1).



Figure 1: Associations and connection within the values, own compilation

It is believed that there are statistically significant differences between the clusters and preferences or values from a production perspective.

Thus, the following theoretical hypothesis was tested:

Due to the clusters we can find differences related to the production associated values.

In order to answer the research questions we defined earlier, we used quantitative research to check the validity of our hypotheses. In order to do this, we used a questionnaire survey method, as our aim was to verify the data and, hence, the hypothesis on a large sample.

To check the association, an Analysis of Variance was conducted. In every single case, statistically significant differences were found.

Based on the theoretical background, a primary scale was developed. All of the items were measured on a fivepointed metric scale, where 1 was not at all important, and 5 was extremely important. The relevant Cronbach alpha value was 0.773, which was acceptable, and the item number was 10. The rated items by the respondents were as follows: environmental awareness; usage of modern technology, after-sales care, available information on the Internet; trustworthy brand; high-level quality assurance; intelligent system usage during the production; communicating as an interactive system; being a smart factory and automatic warranty processes. The cluster membership, like a variable, was measured on a nominal scale and was defined as the independent variable.

The empirical research part was conducted in October 2019, and a multi-cross-sectional research design was done. With the usage of the convenient sampling method, a self-reported online questionnaire was used. This feature led to the limitation of response bias as well. As a result, 2,966 Millennials were asked and reached, and the ratios regarding the main demographic variables were: 61.3 % female and 38.3 % male, 71.2 % Hungarian and 28.8 % Polish respondents. Related to the clusters, the ratios were: Flower-Power 37.98 %, Neutrals 21.15 %, Digital Omnivores 25.34 % and Leisure-loving Digitals 15.53 %. Due to the aim to explore the phenomenon itself and gain some insight into this field, representativeness was not a requirement. Therefore, this is one of the limitations of this paper, and all of the later mentioned recommendations and findings are true only in this sample.

#### 4. Results

As it was mentioned previously, due to the aim, an ANOVA was conducted. The independent variable was the cluster membership (non-metric variable), and the dependent one was the values from a production perspective (metric variable). As it was checked, all of the possible combinations differed significantly (in all cases, the calculated F value was higher than the critical one). As stated previously, the Cronbach alpha value was acceptable (0.773), but in order to define the main dimensions and to help the understanding of the results, we conducted a factor analysis as well. Based on the related statistics (Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.825, Bartlett's test of Spericity's sig: 0.000; extraction method: Principal Component Analysis; rotation method Varimax with Kaiser), the factors were valid, and it explained the total variance in an acceptable level (67.012 %). Three factors were distinguished, and these were the smart features (smart factory, intelligent systems, interactive communication, etc.), the traditional features (trustworthy brand, quality assurance, internet-based information), and environmental features. But these were emphasised less here but used to help the deeper understanding.

Generally (just checking the total values), the following could be stated:

- Most of the previously mentioned features were important (the range was 2.65 to 4.47, the median 3.91, the mean 3.73)
- The most important values were related to the traditional features
- that was followed by the environmental characteristics
- and these were followed by the smart features.

So based on this it can be stated that although the importance of the smart features is more and more important, the traditional values and the environmental- consciousness has a top-of-mind status; and this is a KPI related to the sustainability.

Focusing on the differences originated form the cluster membership it can be concluded that less, but statistically significant differences could be found in the case of traditional values (trustworthy brand, quality assurance and online information) (see Figure 2.; 4. 5. 6. variable), and huge gaps between the other ones.

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Figure 2. Differences from total values, own compilation; Note: the variables (X axis) 1. environmental awareness, 2. usage of modern technology, 3. after-sales care, 4. internet-based information, 5. trustworthy brand, 6. high-level quality assurance, 7. produced by intelligent systems, 8. communicating as an interactive system, 9. being a smart factory, 10. automatic warranty processes and the values (Y axis) are the differences from the total mean in order to emphasise the deviations.

To show the differences, they were evaluated related to the total mean. The statements are the following: Flower-Power: they were known as a highly environmentally conscious cluster, where the modern values were less important compared to the others, like the respect for novelty and other digital-related values. As can be seen here, they chose the same strategy (statistically, the correlation is significant between these values,

namely 0.573), and the environmental awareness was higher than the other production-related feature. The Neutrals: They were neutrals related to the traditional and digital values that formed them. But here, their values were slightly closer to the total mean and the neutral status (except for the environmental issue). They really didn't care about them. Practically, this segment can hardly be persuaded to emphasise these values.

Digital omnivores: previously, they welcomed everything that was digital or made their life more comfortable. Here, the traditional values with less, but the modern values with more deviation can be found. It is worth emphasising if someone wants to reach them.

Leisure-loving Digitals: based on the original variables, the digital offered comfort had emergent values compared to the others. Now, they are between the Digital omnivores and the Neutrals. Surprisingly, the environmental issue was below the average, but the usage of modern technology is one of the highest.

#### 5. Conclusions

The previously defined clusters were different related to the traditional and digital values. In this paper, it was shown that they had statistically significant and different preferences and attitudes from a production perspective as well, so the null hypothesis was rejected. According to the results, we can handle them in a different way. The following can be concluded:

- The environmental issues and sustainability are not equally important for everyone in this sample, but there is a strong correlation between the product and/or production-related values and the general values in this field. So, there is a cluster or segment among the Millennials who can be influenced by this way.
- The traditional features of the products were important for everyone, just slightly, but statistically significant differences could be shown.
- The smart features were differently evaluated, mostly highly among the Digital omnivores and the Leisureloving digitals.

Popularisation of sustainable development goals and awareness of its importance in creating the future may have a significant impact on young people. This can be done by addressing important issues in didactic programs for both schools and universities or in social media, which reach young audiences the fastest. This is important because the approach of young people and their values determine what will be created in the future and how it will function.

#### 6. Recommendations

The findings of the research and the quantitative results of the analyses confirm that the management of companies must be aware of sustainability in all its details. Thus, even at the market cementation stage, it is essential to have adequate information on potential customer groups. Not only to provide them with the right product but also to provide them with the right information or, where appropriate, education on sustainability.

Our clusters give us a good indication of which groups we can expect to reach in sustainability actions and which groups will be the ones that still need to be reached and co-opted by certain means to achieve sustainability goals. Specifically, you can rely on Flower-Powers in the future, but keep an eye on the Leisure-loving digitals team, as they can be rallied around sustainability goals with a well-targeted product, campaign or app. The digital omnivores group, on the other hand, has a strong desire for digital solutions, so it is worth innovating in digital solutions if they support the sustainability strategy.

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